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## **Is Graduate Under-employment Persistent? Evidence from the United Kingdom**

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## **ABSTRACT**

### **Is Graduate Under-employment Persistent? Evidence from the United Kingdom**

This paper examines the persistence of under-employment amongst UK higher education graduates. For the cohort of individuals who graduated in 2002/3, micro-data collected by the *Higher Education Statistical Agency*, are used to calculate the rates of “non-graduate job” employment 6 months and 42 months after graduation. A logit regression analysis suggests the underemployment is not a short-term phenomenon and is systematically related to a set of observable characteristics. It is also found that under-employment 6 months after graduation is positively related to under-employment 42 months after graduation, which is consistent with the view that the nature of the first job after graduation is important in terms of occupational attainment later in the life-cycle.

JEL Classification: I23, J24, J61, R23

Keywords: graduates, under-employment, over-education, persistence, United Kingdom

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# **Is Graduate Under-employment Persistent? Evidence from the United Kingdom**

## **Introduction**

There is a strong belief that there is an “over-education problem” in many high-income countries, with the higher education sectors producing too many graduates for labour markets to absorb (McGuinness, 2006). In turn, over-education creates an “under-employment problem”, with graduates working in jobs that do not require the skills acquired through their study. While empirical research based on a variety of methodological approaches (Lenton, 2011) does provide evidence of significant graduate under-employment, it is often viewed as a “short-term” problem, becoming less prominent the longer graduates remain in the labour market. It is also important to note that there is a growing literature suggesting that the first job after graduation is important in terms of occupational attainment later in the life-cycle (Lauder and Brown, 2009). More specifically, it is argued that experiencing a spell of under-employment after graduation may have longer-term negative impacts on occupational attainment. However, we are aware of no rigorous empirical research that has demonstrated that graduate under-employment is not persistent or that it does not have longer-run impacts on occupational attainment.

## **Material and Methods**

This paper examines the persistence of under-employment in the 2002/2003 cohort of graduates from UK higher education institutions, with micro-data collected in the *Destinations of Leavers from Higher Education Longitudinal Survey* (HESA, 2007). HESA is the official agency in the UK tasked with collecting, compiling and analyzing a variety of data relating to the higher education sector. In this survey, respondents are interviewed 6 months after graduation and 42 months after graduation and detailed information is collected on employment, subject of study, class of qualification obtained, mode of study, age at

graduation, gender, place of study and place of domicile. In this paper, the focus is on “under-graduate graduates” i.e. those who received under-graduate qualifications (mainly degrees) in 2003.

There is no agreed definition of what constitutes “under-employment”. The dominant empirical approach is to fit Mincer-type earnings equations that include self-assessed measures that attempt to capture the extent to which the respondent is using the skills obtained through higher education (McGuinness, 2006). With this approach, under-employment is measured in terms of earnings loss e.g. earnings are x-per cent lower because of under-employment. One problem with this approach is that the self-assessed measures are likely characterised by a considerably amount of measurement error. We believe that this partly explains why the estimates of under-employment following this approach vary considerably both within and between countries.

As a consequence, this paper uses a direct measure of under-employment suggested by Elias and Purcell (2004). They examined each of the 353 unit groups of the 2000 Standard Occupational Classification (SOC) and classified each of this unit groups by the type of skills needed to carry out the work. Non-graduate occupations are those where the skills obtained through higher education are “inappropriate”. It is important to stress that this is a very stringent definition of non-graduate employment, consisting largely of what may be termed “dead-end jobs” such as taxi driver, waitress/waiter, secretary, receptionist, construction labourer and security guard. There is little disagreement that jobs that fall into this category do not require higher education to execute the required tasks. See Elias and Purcell (2004: 20-28) for the precise classification.

In order to explore the possible determinants of non-graduate employment, a panel dataset was constructed from the HESA databases. This dataset consists of individuals from

the 2002/03 cohort of graduates who obtained an under-graduate qualification (mainly degrees). To be included, the graduate needed to be in employment both at 6 months and at 42 months after graduation. This resulted in a sample size of 10,415. As Table 1 shows, 63.1% were employed in graduate-jobs 6 months after graduation. By 42 months after graduation, this rate was higher at 77.1%. In other words, more than 1 in 3 are employed in non-graduate jobs after 6 months. Even though the rate of non-graduate employment falls with time, it is still more than 1 in 5 after 42 months. To us, these estimates indicate high and persistent levels of under-employment amongst graduates of UK higher education institutions.

<<<< Table 1 About Here >>>>

### **Regression Estimates**

In order to understand the possible determinants of under-employment, logit regression equations are estimated. In these equations, the probability of being in graduate employment at 6 or 42 months after graduation was related to a set of observed characteristics. The variables included in these regressions are shown in Table 1: gender; mode of study; disability status; ethnicity; award classification; subject studied; type of institution attended; age at graduation; place of domicile and place of study. Although most of these variables are straightforward in terms of their measurement, it is worth commenting on several of them further.

The UK uses an arcane system (which varies across institutions) to indicate how well a student has done in their study. Most degrees are awarded subject to a classification banding with “1<sup>st</sup> class honours” being the highest level of attainment and “Third class honours (and below)” being a much lower level of attainment. Qualifications are also awarded that do not

use this banding system. Disability status is a self-reported measure. The category “interdisciplinary” subject studied included qualifications that are a mix of subjects across the sciences, social sciences and arts and humanities. “Russell Group” institutions are a lobbying group of large, research-led universities and include the Universities of Oxford and Cambridge, University College London, Imperial College London and the University of Manchester (for the other members see: [www.russellgroup.ac.uk](http://www.russellgroup.ac.uk)). “Pre-1992” institutions are universities established before 1992. “Post-1992” institutions are mainly former polytechnics and colleges of higher education that were awarded university status after 1992. A “specialist” institution is a higher education institution that is usually small in size with only a limited range of subjects (or a single subject such as music or art). “Place of domicile” refers to the country within the UK the graduate completed their secondary schooling. “Place of study” refers to the country within the UK where they completed their under-graduate higher education.

The logit regression estimates are given in Table 2. Column (1) shows the estimates for the equation for graduate employment 6 months after graduation. The estimates suggest that the probability of being in graduate employment is higher for: women; those who studied full-time; those who do not have a disability; those whose ethnicity is not non-white; those who were awarded their qualifications with “first-class honours”; those who studied a science subject; those who studied at a “Russell Group” university; those who completed their secondary schooling in England; and those who studied at a higher education institution in England. Column (2) shows the estimates for the equation for graduate employment 42 months after graduation. The pattern of findings is very similar to what is the case for 6 months after graduation equation in terms of the signs of the coefficients. However, the magnitudes of the effects are in general smaller in the 42 months equations. In addition, the



overall “goodness-of-fit”, as suggested by the log likelihood and pseudo  $R^2$  values, is considerably better in the 6 months equations.

<<<< Table 2 about here >>>>

Column (3) shows the estimates for the equation for graduate employment at 42 months that includes whether the graduate was in graduate employment 6 months after graduation as a right-hand side variable. Being in a graduate job 6 months after graduation has a strong positive (and highly statistically significant) effect on the probability of being in a graduate job 42 months after graduation. The predicted probability of being in a graduate job at 42 months for those in a graduate job at 6 months is 86.8%. This is considerably higher than the 60.5% predicted probability of being in a graduate job at 42 months for those not in a graduate job at 6 months. In addition, the effects of most of the other variables included in this equation are smaller in magnitude and most are not statistically significant at conventional threshold levels.

Columns (4) and (5) show equations for graduate employment at 42 months after graduation estimated separately for those “not in” and those “in” a graduate job 6 months after graduation. In both equations, most of the included variables are not statistically significant at conventional threshold levels. However, the overall goodness-of-fit is better for the equation estimated on the sample of graduates who were in a graduate job 6 months after graduation. This suggests that for this sample, as a group, the included variables are a better predictor of being in a graduate job 42 months after graduation. The examination of individual coefficients also indicates that there are more significant effects in the in graduation employment at 6 months equation.

## Discussion and Conclusion

The analysis presented in this paper suggests that under-employment, measured as employment in non-graduate jobs, is high amongst under-graduates of higher education institutions in the United Kingdom. The analysis also suggests that under-employment is persistent and is not a short-term phenomenon. Although under-employment declines with time, almost a quarter of graduates are employed in non-graduate jobs 3½ years after graduation.

A regression analysis suggests that under-employment measured in this way is not a random process and is systematically related to individual-level characteristics. The impact of these characteristics as a group on the probability of being employed in a graduate job is more important (from a statistical point of view) 6 months after graduation compared to 42 months after graduation. For example, those graduates who have “done well” in their study (e.g. were awarded their qualification with 1<sup>st</sup> class honours and graduated from a Russell Group university) have a higher probability of being in graduate employment, particularly at 6 months after graduation. There are also clear regional effects, with graduates who completed their secondary schooling and higher education in England having a significantly higher probability of being in graduate employment, again particularly 6 months after graduation.

The regression analysis also indicates there is a strong positive relationship between the probability of being in a graduate job 6 months after graduation and the probability of being in a graduate job 42 months after graduation. Given that panel data is used and that the 6 months outcome precedes the 42 months outcome in a temporal sense, this relationship is potentially causal in nature. In addition, once this relationship is controlled for statistically, the impact of individual-level characteristics becomes less important. It was also found that these characteristics are more important predictors of the probability of being in a graduate job amongst those graduates who were employed in a graduate job 6 months after graduation.

We believe these finding represent strong empirical support for the hypotheses that the first job after graduation is important in terms of occupational attainment later in the life-cycle.

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**Table 1**  
**Variables Included in Logit Regressions**

<b>Variable</b>	<b>Definition</b>	<b>%</b>
<u>Employment:</u>		
• GradJob(6)	Employed in a graduate-job 6 months after graduation=1; Non-graduate job=0	63.1%
• GradJob(42)	Employed in a graduate-job 42 months after graduation=1; Non-graduate job=0	77.1%
<u>Gender:</u>		
• Male	Gender: Male=1; Female=0	38.6%
<u>Mode of Study:</u>		
• Full-time	Studied on full-time basis=1; Studied on a part-time basis=0	84.4%
<u>Disability Status:</u>		
• Disabled	Disability status: Disabled=1; Not disabled=0	5.4%
• Disability missing	Disability status missing=1; Disability status not missing =0	1.5%
<u>Ethnicity:</u>		
• Ethnicity non-white	Ethnicity: Non-white=1; Otherwise=0	10.8%
• Ethnicity missing	Ethnicity missing=1; Ethnicity not missing =0	4.7%
<u>Award Classification:</u>		
• 1st class	Qualification obtained with “First class honours”=1; Otherwise=0	7.9%
• 2.1 class	Qualification obtained with “Second class, upper division honours” =1; Otherwise=0	38.3%
• 2.2 class	Qualification obtained with “Second class, lower division honours” (reference category)	27.0%
• 3rd class and below	Qualification obtained with “Third class honours” or below=1; Otherwise=0	12.1%
• Other classification	Qualification obtained with “other” classification =1; Otherwise=0	14.8%
<u>Subject Studied:</u>		
• Science	Studied a science subject=1; Otherwise=0	48.5%
• Social Science	Studied a social science subject=1 Otherwise=0	25.2%
• Arts and Humanities	Studied an arts and humanities subject (reference category)	23.3%
• Interdisciplinary	Interdisciplinary programme=1; Otherwise=0	2.9%
<u>Type of Institution Attended:</u>		
• Russell Group	Institution is a member of the “Russell Group” =1; Otherwise=0 (see text)	19.6%
• Pre-1992	Institution was a university prior to 1992 (reference category)	23.7%
• Post-1992	Institution became a university after 1992=1; Otherwise=0	43.3%

• Specialist	A specialist HEI institution=1; Otherwise=0	13.3%
<u>Age at Graduation:</u>		
• Age at graduation < 25	Age at graduation less than 25 years (reference category)	71.0%
• Age at graduation 25-29	Age at graduation greater than 24 but less than 30 years=1; Otherwise=0	8.8%
• Age at graduation 30+	Age at graduation greater than 30 years=1; Otherwise=0	20.2%
<u>Place of Domicile:</u>		
• England	Place of domicile England (reference category)	82.4%
• Northern Ireland	Place of domicile Northern Ireland=1; Otherwise=0	3.7%
• Scotland	Place of domicile Scotland=1; Otherwise=0	8.9%
• Wales	Place of domicile Wales=1; Otherwise=0	4.9%
<u>Place of Study:</u>		
• England	Studied in England (reference category)	81.6%
• Northern Ireland	Studied in Northern Ireland=1; Otherwise=0	3.0%
• Scotland	Studied in Scotland=1; Otherwise=0	9.6%
• Wales	Studied in Wales=1; Otherwise=0	5.8%
Notes: Sample size is 10,415. Estimates are weighted to reflect population totals		

**Table 2**  
**Logit Regression Estimates of the Probability of Being in a Graduate Job**  
**6 Months and 42 Months After Graduation**  
**UK-domiciled students**  
**2002/03 Undergraduate Graduate Cohort**

	(1)	(2)	(3)	(4)	(5)
<b>Dependent</b>	<b>GradJob(6)</b>	<b>GradJob(42)</b>	<b>GradJob(42)</b>	<b>GradJob(42)</b>	<b>GradJob(42)</b>
<b>Sample</b>	<b>All</b>	<b>All</b>	<b>All</b>	<b>GradJob(6)=0</b>	<b>GradJob(6)=1</b>
<b>Male</b>	-0.222	-0.165	-0.112	0.090	-0.244
	[4.6]	[2.0]	[1.3]	[0.7]	[1.9]
<b>Full-time</b>	0.129	0.323	0.388	-0.029	0.681
	[1.6]	[2.4]	[2.7]	[0.1]	[3.3]
<b>Disabled</b>	-0.128	-0.182	-0.167	-0.029	-0.420
	[1.3]	[1.1]	[0.9]	[0.1]	[1.8]
<b>Disability missing</b>	0.228	0.029	0.071	0.071	0.079
	[1.2]	[0.1]	[0.2]	[0.1]	[0.2]
<b>Ethnicity non-white</b>	-0.441	-0.092	-0.066	-0.054	-0.008
	[7.7]	[1.2]	[0.8]	[0.5]	[0.1]
<b>Ethnicity missing</b>	-0.052	-0.159	-0.081	-0.160	0.059
	[0.4]	[0.8]	[0.4]	[0.6]	[0.2]
<b>1st class</b>	0.754	0.483	0.286	0.626	0.019
	[7.3]	[2.7]	[1.5]	[2.1]	[0.1]
<b>2.1 class</b>	0.389	0.198	0.083	0.106	0.077
	[7.0]	[2.0]	[0.8]	[0.8]	[0.5]
<b>3rd class and below</b>	0.446	-0.123	-0.259	-0.375	-0.195
	[5.5]	[0.9]	[1.8]	[1.9]	[0.9]
<b>Other classification</b>	0.241	0.017	-0.117	-0.442	0.030
	[3.1]	[0.1]	[0.8]	[2.1]	[0.1]
<b>Science</b>	0.657	0.669	0.506	0.086	0.959
	[10.7]	[6.2]	[4.5]	[0.6]	[5.8]
<b>Social Science</b>	-0.406	-0.027	0.035	0.032	0.080
	[6.3]	[0.2]	[0.3]	[0.2]	[0.5]
<b>Interdisciplinary</b>	-0.468	-0.002	0.067	-0.130	0.555
	[2.8]	[0.0]	[0.3]	[0.3]	[1.6]
<b>Russell group</b>	0.145	0.429	0.398	0.511	0.245
	[2.0]	[3.3]	[2.9]	[2.6]	[1.3]
<b>Post-1992</b>	-0.258	-0.197	-0.122	-0.194	0.061
	[4.1]	[1.9]	[1.1]	[1.2]	[0.4]
<b>Specialist</b>	-0.040	-0.109	-0.050	-0.144	0.189
	[0.5]	[0.8]	[0.4]	[0.7]	[0.9]

<b>Age at graduation 25-29</b>	0.690	0.270	0.078	-0.401	0.462
	[8.0]	[1.8]	[0.5]	[1.7]	[2.0]
<b>Age at graduation 30+</b>	1.401	0.756	0.379	-0.261	0.697
	[18.3]	[5.9]	[2.8]	[1.2]	[3.6]
<b>Domiciled in Northern Ireland</b>	0.247	0.234	0.081	0.396	-0.191
	[1.5]	[1.2]	[0.4]	[1.4]	[0.7]
<b>Domiciled in Scotland</b>	-0.034	0.040	0.051	0.135	0.051
	[0.2]	[0.2]	[0.3]	[0.5]	[0.2]
<b>Domiciled in Wales</b>	-0.194	0.097	0.106	0.031	0.188
	[2.0]	[0.9]	[0.9]	[0.2]	[1.1]
<b>Studied in Northern Ireland</b>	-0.569	-0.452	-0.334	-0.865	0.240
	[3.2]	[2.2]	[1.5]	[2.7]	[0.8]
<b>Studied in Scotland</b>	-0.452	0.113	0.145	-0.067	0.317
	[3.3]	[0.6]	[0.7]	[0.2]	[1.2]
<b>Studied in Wales</b>	-0.347	-0.224	-0.192	-0.172	-0.158
	[3.6]	[1.9]	[1.6]	[1.0]	[0.9]
<b>Graduate Job (6 months)</b>	--	--	1.346	--	--
	--	--	[15.1]	--	--
<b>Constant</b>	0.276	0.521	-0.101	0.492	0.608
	[2.3]	[2.6]	[0.5]	[1.6]	[2.0]
<b>Log likelihood</b>	-5,834.8	-5,377.8	-5,034.2	-2,150.9	-2,647.3
<b>Pseudo R<sup>2</sup></b>	10.4%	4.7%	10.2%	3.2%	4.5%
<b>N</b>	10,415	10,415	10,415	3,311	7,104
Notes: Ratio of coefficient to its standard error in parentheses. Regressions are weighted.					